PhytoKeys 197: 33–39 (2022)
doi: 10.3897/phytokeys.197.83089
https://phytokeys.pensoft.net

RESEARCH ARTICLE

A peer-reviewed open-access journal
PhytoKeys
Launched to accelerate biodiversity research

Primulina nana (Gesneriaceae), a new species from eastern Guangxi, China

Chi Xiong[1,2], Wei-Chuen Chou[2], Yi Huang[2], Fang Wen[1,2]

1 *Guangxi Key Laboratory of Plant Conservation and Restoration Ecology in Karst Terrain, Guangxi Institute of Botany, Guangxi Zhuang Autonomous Region and Chinese Academy of Sciences, CN-541006, Guilin, China* **2** *National Gesneriaceae Germplasm Resources Bank of GXIB, Gesneriad Committee of China Wild Plant Conservation Association, Gesneriad Conservation Center of China (GCCC), Guangxi Institute of Botany, Guilin Botanical Garden, Guangxi Zhuang Autonomous Region and Chinese Academy of Sciences, CN-541006, Guilin, China*

Corresponding author: Fang Wen (wenfang760608@139.com)

Academic editor: Eberhard Fischer | Received 4 March 2022 | Accepted 19 April 2022 | Published 23 May 2022

Citation: Xiong C, Chou W-C, Huang Y, Wen F (2022) *Primulina nana* (Gesneriaceae), a new species from eastern Guangxi, China. PhytoKeys 197: 33–39. https://doi.org/10.3897/phytokeys.197.83089

Abstract

Primulina nana C.Xiong, W.C.Chou & F.Wen, a new species of Gesneriaceae from limestone areas of Guangxi, China, is described and illustrated here. It morphologically resembles *P. yangshuoensis* Y.G.Wei & F.Wen in papillose leaf surface, but can be easily distinguished from the latter by noting a combination of characteristics, especially in its leaf blades, leaf blade indumentum characteristic, calyx lobes, corolla and the disc. We found only one population at the type locality, about 200 mature individuals. According to the IUCN Red List Categories and Criteria (Version 3.1), the new species is provisionally assessed as Critically Endangered (CR).

Keywords

Flora of Guangxi, Gesneriaceae, new taxon, *Primulina yangshuoensis*, taxonomy

Introduction

The genus *Primulina s.l.* was redefined in 2011, comprising *Chiritopsis* W.T.Wang, *Wentsaiboea* D.Fang & D.H.Qin (except *W. tiandengensis* Yan Liu & B. Pan) and the large number of species described in *Chirita* sect. *Gibbosaccus* C.B.Clarke

Copyright *Chi Xiong et al.* This is an open access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

(Wang et al. 2011; Weber et al. 2011). This genus now exhibits the most diversity in the Chinese Gesneriaceae, including approximately123 species and eight varieties of *Primulina s.l.* after the revision (Wang et al. 2011; Weber et al. 2011). An acceleration of *Primulina* species discovery has been seen over the last decade, with an average of about 10 new species per year. As of February 2022, there were 221 species (excluding infraspecific taxa) (GRC 2022) in this genus. China is the centre of diversity for *Primulina* with at least 204 species and 15 varieties occurring there at present (Wen et al. 2022), especially in limestone areas (Wei 2018; Wen et al. 2019; Ge et al. 2020; Liu et al. 2020; Xin et al. 2020a, b, c, 2021; Zhang et al. 2021). The tropical and subtropical karst limestone mountainous areas of Guangxi, China, are the centres of species diversity and differentiation of this genus (Li et al. 2019).

In October 2021, Y. Huang, a Gesneriaceae enthusiast from Guangxi, found this unknown plant in the wild. One of the authors, W.C. Chou, went to the type locality and collected specimens. Some of the living plants were introduced and cultivated at the Gesneriad Conservation Center of China (GCCC) and the National Gesneriaceae Germplasm Bank for further research. Comparison of the live plants with the type specimens and protologues of all known species of *Primulina* led to the determination that these specimens neither fit the existing protologues nor conform to the type specimens of these species. Nevertheless, the leaves' tiny shape and texture make them very particular and most similar to *P. yangshuoensis* Y.G.Wei & F.Wen (Wen et al. 2012). However, a combination of characteristics easily distinguished it from other species, especially in its leaf blades, leaf blade indumentum, calyx lobes, corolla and the disc characters. We confirmed that it represents a new species of *Primulina* and describe it here.

Taxonomic treatment

***Primulina nana* C.Xiong, W.C.Chou & F.Wen, sp. nov.**
Figs 1, 2A1–F1
urn:lsid:ipni.org:names:77298577-1

Diagnosis. The new species resembles *Primulina yangshuoensis* (Fig. 2A2–F2) in papillose leaf surface, namely numerous single pubescent hair on papilla on surface, but can be easily distinguished from the latter by its leaf blade elliptic to ovate, 1.6–1.8 × 1.1–1.3 cm (vs. broadly ovate-round, subround or round, 3.5–6.5 × 2–4.5 cm); leaf nearly erect semi-transparent papillose-puberulent and white pubescent (vs. densely erect semi-transparent and white multicellular papillose-hispid); peduncle 3–5 cm long (vs. 8–9 cm); calyx lobes with one serration (vs. entire); corolla ca. 1.5 cm long, tube tubular (vs. 2–3 cm, broadly infundibuliform); disc ca. 0.6 mm high (vs. ca. 1 mm). Detailed morphological comparisons with *P. yangshuoensis* are provided in Table 1.

Type. China. Guangxi Zhuangzu Autonomous Region: Wuzhou City, Mengshan County, Xinxu Town, 24°19'N, 110°22'E, altitude ca. 530 m, November 26, 2021, *Chou Wei-Chuen & Huang Yi CWC211126-01* (IBK!)

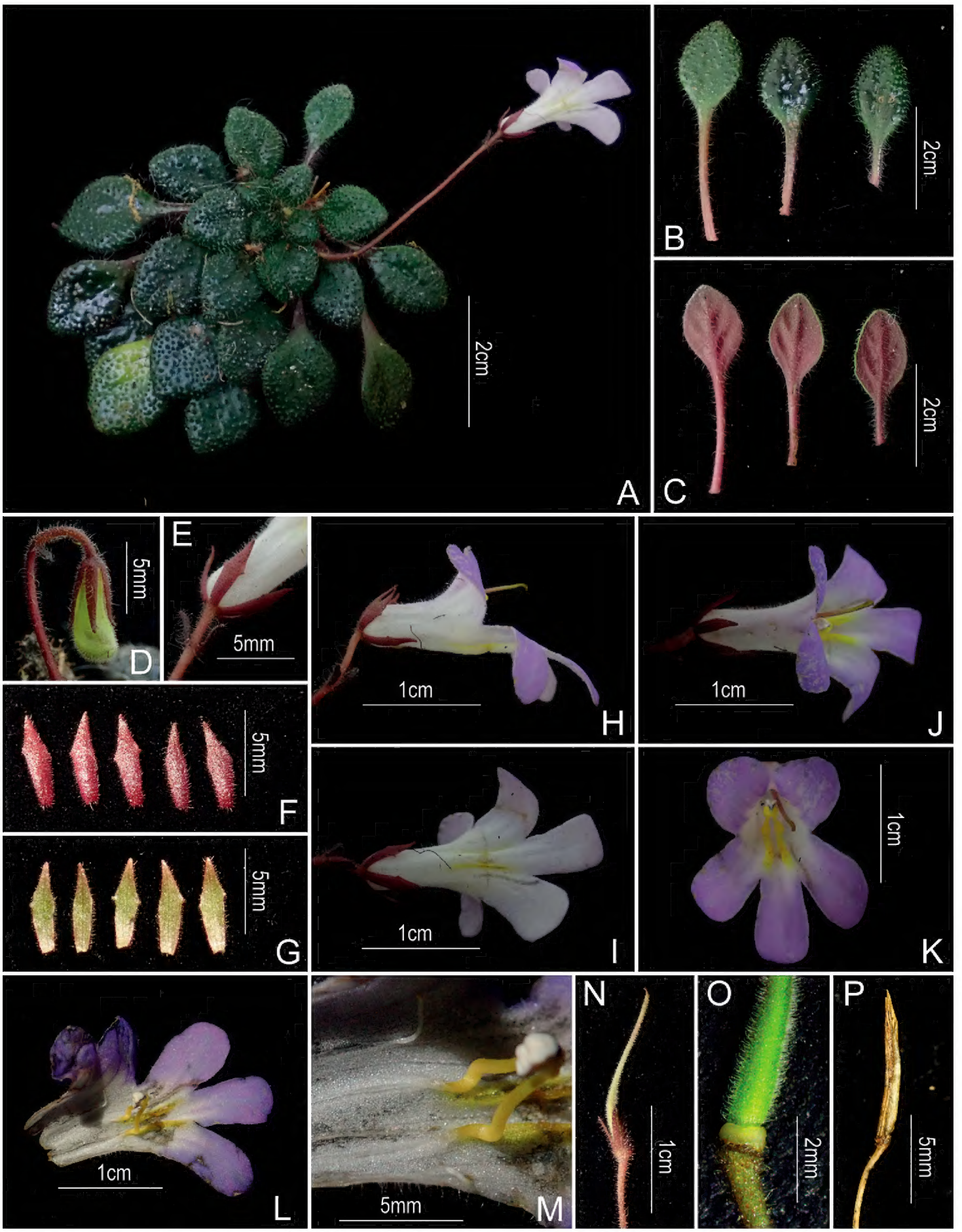

Figure 1. *Primulina nana* sp. nov. **A** habit **B** adaxial side of leaves **C** abaxial side of leaves **D** alabastrum **E** bracts and calyx **F** abaxial side of calyx lobes **G** adaxial side of calyx lobes **H** lateral view of a flower **I** ventral view of a flower **J** top view of a flower **K** front view of a flower s howing the internal structure **L** opened corolla **M** stamens and staminodes **N** pistil with calyx **O** disc and ovary **P** capsule. Photographs by Chi Xiong.

Description. Herbs perennial, acaulescent, rhizome subterete, ca. 1.5 cm long, 4–6 mm in diameter, Leaves 14–23, all basal, petiolate; petiole 1–3 cm long, ca. 1.5 mm in diameter, purple, densely pubescent; leaf blade elliptic to ovate, 1.6–1.8 × 1.1–1.3 cm,

leathery, adaxially dark green to purplish-green, nearly erect semi-transparent papillose-puberulent on adaxial surface, 1–2 mm long, abaxially purple, white pubescent, 1–2 mm long, base broadly cuneate, margin entire, apex acute to obtuse, lateral veins inconspicuous, 2–3 on each side. Cymes 2–4, axillary; usually simple, peduncle 3–5 cm long, ca. 0.8 mm in diameter, pubescent;bracts 2, opposite, oblong to linear, 2.5–3 × ca. 1 mm, pubescent on both surfaces, margin entire, apex obtuse. Calyx 5-parted to base, lobes lanceolate, ca. 5 × 1–1.5 mm, nearly equal, outside purple, densely pubescent, inside yellow-green, nearly glabrous, usually with one serrate on the middle of calyx lobe, apex acute. Corolla purple, throat with two yellow stripes inside, ca. 1.5 cm long, outside glandular and eglandular puberulent, inside glabrous, tube tubular and gradually narrowing to the bottom, ca. 1 cm long, orifice 5–6 mm in diameter; limb distinctly 2-lipped, adaxial lip 2-parted to the middle, lobes oblong or round, apex round, 3–4 × 5–6 mm, abaxial lip 3-parted to near the base, lobes oblong, apex round, 6–8 × 4–5 mm. Stamens 2,adnate ca. 8 mm above the corolla base; filaments yellow, ca. 5 mm long, geniculate near the base, glabrous, anthers reniform, slightly constricted at middle, 1.5–2 mm long; staminodes 3, lateral ones linear, glabrous, ca. 3 mm long, apex capitate, glabrous, adnate to ca. 7 mm above the corolla tube base, the central one inconspicuous, adnate near the corolla tube base. Disc annular, ca. 0.6 mm high, margin repand, glabrous. Pistil 1.4–1.6 cm long, ovary 5–6 mm long, ca. 1 mm in diameter, glandular-pubescent; style ca. 1 cm long, 0.6 mm in diameter, glandular-pubescent; stigma obtrapeziform, ca. 1 mm long. Fruit linear, longitudinally dehiscent, 8–9 mm long, ca. 1.5 mm in diameter.

Phenology. Flowering in November, fruiting from December to the following January.

Etymology. The specific epithet '*nana*' is derived from the dwarf plants of the new species compared with that of most other species of *Primulina*.

Vernacular name. 玲珑报春苣苔 (Chinese name); Líng Lóng Bào Chūn Jù Tái (Chinese pronunciation).

Distribution and habitat. *Primulina nana* is only known from the type locality, Xinxu Town, Mengshan County, Wuzhou City, Guangxi, China. It grows on moist, shady limestone rock surfaces, at an elevation of ca. 530 m.

Conservation status. *Primulina nana* is only known from one population of about 200 mature individuals at the type locality. This population has been reduced by 90%

Table 1. Detailed comparison of *Primulina nana* and its relative *P. yangshuoensis*.

Characters	*P. nana*	*P. yangshuoensis*
Leaf-blades	elliptic to ovate, 1.6–1.8 × 1.1–1.3 cm	broadly ovate-round, subround or round, 3.5–6.5 × 2–4.5 cm
Leaf indumentum	densely nearly erect semitransparent papillose-puberulent on adaxial surface, 1–2 mm long, abaxially purple, densely white pubescent, 1–2 mm long	densely erect semitransparent or white multicellular papillose-hispid on both surfaces, 0.8–1 cm long on the adaxial surface, 4–5 mm long on the abaxial surface
Peduncle	3–5 cm long	8–9 cm long
Bracts	oblong to linear, 2.5–3 × ca.1 mm	lanceolate or subulate, 1–2 × 0.3–0.5 mm
Calyx lobes	Usually, one serrate at the middle	entire
Corolla	ca.1.5 cm long, tube tubular and gradually narrow to the bottom	2–3 cm long, tube broadly infundibuliform
Disc	ca. 0.6 mm high	ca. 1 mm high

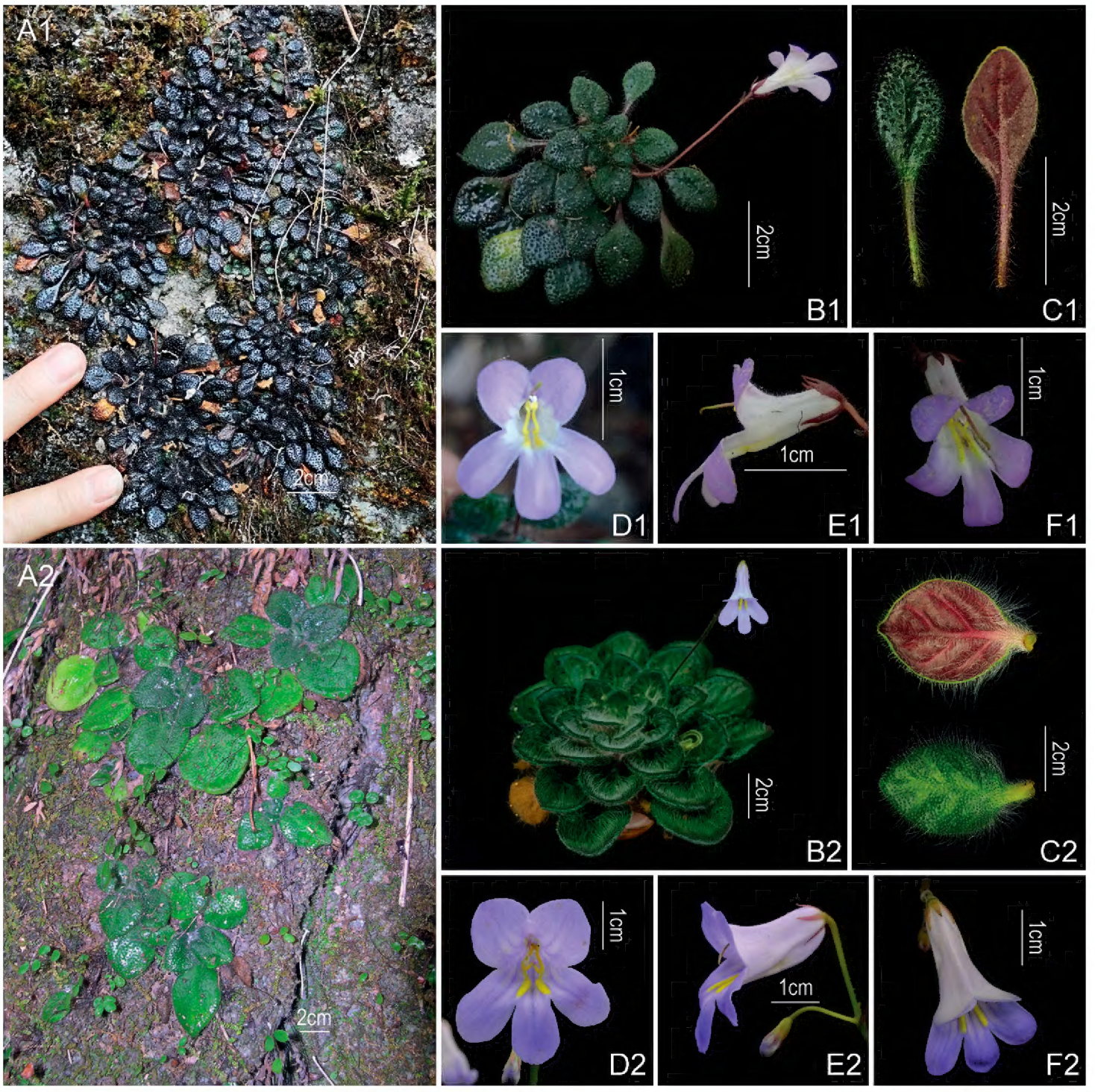

Figure 2. Morphological comparison of *Primulina nana* sp. nov. (1) with *P. yangshuoensis* (2) **A** habitat **B** habit **C** leaf blades **D** front view of flowers **E** lateral view of flowers **F** top view of flowers. **A1** and **D1** photographed by Wei-Chuen Chou; **B1–C1, E1–F1, C2** photographs by Chi Xiong; **A2–B2** and **D2–F2** photographed by Fang Wen.

from when it was originally found. The EOO and AOO of the new species are about 0.2 km^2 and 25 m^2, respectively. Its beautiful flowers, thickened woody rhizomes and shapely leaves, led to over-harvesting by locals, who sold it as an ornamental plant. Thus, following the IUCN Red List Categories and Criteria (IUCN 2019), it is temporarily assessed as Critically Endangered [CR B1ab (iii, v) + B2ab (iii, v)].

Notes. The plant size of *Primulina nana* is dwarf and leaf blade length is less than 2 cm, but length of flowers is about 1.5 cm and the proportion of flowers and leaves is unusual in this genus. These characters differ from other *Primulina* species and can be clearly distinguished from *P. yangshuoensis* in morphological characters (Table 1).

Acknowledgements

We want to thank Michael LoFurno (Adjunct Professor, Temple University) and Stephen Maciejewski, the Gesneriad Society, from Philadelphia, the USA, for their editorial assistance; Bin Qiu and Shi-Jun Zheng for their help in the field. This study was financially supported by the Key Sci. & Tech. Research and Development Project of Guangxi (Guike AD20159091 & ZY21195050), the capacity-building project of SBR of CAS (KFJ-BRP-017-68), Basal Research Fund of GXIB (Guizhiye20009 & Guizhifa010) and the Fund of Technology Innovation Alliance of Flower Industry (2020hhlm005).

References

Ge YZ, Xin ZB, Fu LF, Chou WC, Huang Y, Huang ZJ, Maciejewski S, Wen F (2020) *Primulina hochiensis* var. *ochroleuca* (Gesneriaceae), a new variety from a limestone area of Guangxi, China, and errata on five new species of *Primulina*. PhytoKeys 152: 111–120. https://doi.org/10.3897/phytokeys.152.50968

GRC (2022) [continuously updated] Gesneriaceae Resource Centre. Royal Botanic Garden Edinburgh. [Internet address:] https://padme.rbge.org.uk/GRC [Accessed: 14 Feb 2022]

IUCN (2019) Guidelines for Using the IUCN Red List Categories and Criteria. Version 14. Prepared by the Standards and Petitions Subcommittee of the IUCN Species Survival Commission. http://cmsdocs.s3.amazonaws.com/RedListGuidelines.pdf

Li S, Xin ZB, Chou WC, Huang Y, Pan B, Maciejewski S, Wen F (2019) Five new species of the genus *Primulina* (Gesneriaceae) from Limestone Areas of Guangxi Zhuangzu Autonomous Region, China. PhytoKeys 127: 77–91. https://doi.org/10.3897/phytokeys.127.35445

Liu K, Meng DC, Huang ZJ, Maciejewski S, Xin ZB (2020) *Primulina jiuyishanica* (Gesneriaceae), a new species from Hunan, China. PhytoKeys 162: 37–44. https://doi.org/10.3897/phytokeys.162.53763

Wang YZ, Mao RB, Liu Y, Li JM, Dong Y, Li ZY, Smith JF (2011) Phylogenetic reconstruction of *Chirita* and allies (Gesneriaceae) with taxonomic treatments. Journal of Systematics and Evolution 49(1): 50–64. https://doi.org/10.1111/j.1759-6831.2010.00113.x

Weber A, Middleton DJ, Forrest A, Kiew R, Lim CL, Rafidah AR, Sontag S, Triboun P, Wei YG, Yao TL, Möller M (2011) Molecular systematics and remodeling of *Chirita* and associated genera (Gesneriaceae). Taxon 60(3): 767–790. https://doi.org/10.1002/tax.603012

Wei YG (2018) The Distribution and Conservation Status of Native Plants in Guangxi, China. China Forestry Publishing House, Beijing, 876 pp.

Wen F, Wang F, Wei YG (2012) *Primulina yangshuoensis*, a New Species of Gesneriaceae from Guangxi, China. Taiwania 57(1): 55–61. https://doi.org/10.6165/tai

Wen F, Li S, Xin ZB, Fu LF, Cai L, Qin JQ, Pan B, Hong X, Pan FZ, Wei YG (2019) The Updated Plant List of Gesneriaceae in China under the New Chinese Naming Rules. Guangxi Sciences 26(1): 37–63.

Wen F, Wei YG, Fu LF, Xin ZB, Ge YZ (2022) [continuously updated] Gesneriad Conservation Center of China. http://gccc.gxib.cn [Accessed: 14 Feb 2022]

Xin ZB, Fu LF, Huang ZJ, Chou WC, Huang Y, Wen F (2020a) *Primulina titan* sp. nov. (Gesneriaceae) from a Limestone Area in Northern Guangxi, China. Journal of Botanical Research 2(3): 1–4. https://doi.org/10.30564/jrb.v2i3.1994

Xin ZB, Huang ZJ, Chou WC, Huang Y, Meng DC, Wen F (2020b) *Primulina qintangensis* (Gesneriaceae), A new species from limestone areas of Guangxi, China. Xibei Zhiwu Xuebao 40(8): 1424–1427. https://doi.org/10.30564/jrb.v2i3.1994

Xin ZB, Huang ZJ, Fu LF, Li S, Wang BM, Wen F (2020c) *Primulina spiradiclioides* (Gesneriaceae), a new species from limestone areas in Guangxi, China. Annales Botanici Fennici 57(4–6): 245–248. https://doi.org/10.5735/085.057.0408

Xin ZB, Chou WC, Fu LF, Maciejewski S, Wen F (2021) *Primulina papillosa* (Gesneriaceae), a new species from limestone areas of Guangxi, China. PhytoKeys 177: 55–61. https://doi.org/10.3897/phytokeys.177.63878

Zhang JQ, Huang H, Li MJ, Huang M, Li QY, Zhou YL, Chen Y, Wen F, Bai XX (2021) *Primulina silaniae* sp. nov. (Gesneriaceae) from the limestone area of Guizhou Province, China. PhytoKeys 185: 123–130. https://doi.org/10.3897/phytokeys.185.72099